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Geological Survey of Victoria.

OBSERVATIONS

ON

NEW VEGETABLE FOSSILS

OF THE

AURIFEROUS DRIFTS.

BY

BARON FERDINAND VON MUELLER,

C.M.G.; M.D.; Ph.D.; F.R.S. and L.S.; Government Botanist, &c., &c.

"COELI SICUT FUMUS LIQUESCANT, ET TERRA SICUT VESTIMENTUM ATTERATUR, ET HABITATORES EJUS SICUT
HÆC INTERIBUNT."—*Prophetia Isaie, cap. li., v.*



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OFFICE OF MINES,
Melbourne, 1st October 1874.

SIR,

I have the honor to submit the Observations of Baron von Mueller, C.M.G., on the New Vegetable Fossils found in the deep auriferous drifts, together with plates, maps, and sections, and notes on the geology of the localities where the fossils were obtained.

I have the honor to be,

Sir,

Your most obedient Servant,

R. BROUGH SMYTH,
Secretary for Mines.

The Honorable Angus Mackay, M.P.,
Minister of Mines, &c., &c., &c.

NOTE.

WHEN the deep *leads* at Ballarat, Creswick, Raglan, and Ararat, were first explored, the miners were surprised to find in the dark-blue and black clays overlying the auriferous drifts, large trees, some in such perfect preservation as to admit of the wood being converted to use. The surface of the trunks was invariably carbonized, and the interior much riven, and in the fissures and interstices were found nests of auriferous iron pyrites.

Cones of *Banksias*, not differing carpologically from those of some of the living honeysuckle trees, were collected about twenty years ago in the older drifts of Creswick, and being examined, at the request of the late Sir Roderick Murchison, by the illustrious botanist, the late Robert Brown, were identified as such by him.*

Similar cones have since been obtained by Mr. Arrowsmith from the *leads* at Beechworth and Chiltern. At depths varying from 100 feet to 400 feet, vegetable fossils of the like kind occur; and the Department of Mines, through its officers, and with the friendly co-operation of mining managers and miners, has accumulated much material for the palæontologist.

In the Exchequer Claim at Daylesford, there is a stratum of hard black mud or clay in thin layers, enclosing fossil leaves of some species of *eucalyptus*. These leaves still preserve their fragrance, and if slightly rubbed with the finger the distinctive odour of the *eucalyptus* is at once perceptible.

Nearly all the fossils of this character were, from time to time, submitted to Baron von Mueller for examination; but, in consequence of the absence of *eucalyptus* fruit, the identification or definition of the species was difficult, if not impossible.

* *Siluria*, p. 452.

Baron von Mueller constantly urged the necessity of a careful examination of the clays of the deep *leads*, in the hope that some fruits or seeds would be discovered ; and the officers of the Department were consequently active in procuring specimens of all kinds. It was not, however, until I learnt from the late Mr. Greer, that fossil fruits had been obtained from the deep *leads* of the Haddon district, that any really valuable vegetable fossils were brought to light. Through his kind intervention a good collection was made, and subsequently Mr. John Lynch, and the mining managers and miners at Haddon, have added largely to it.

The account which follows of the vegetation of the period when our older auriferous drifts were deposited is singularly interesting, and now we have to record the fact that the genera and species of plants first discovered at Haddon had a very wide range.

Mr. J. S. Thomas, of Orange, in New South Wales, was good enough to send me, in reply to a request made to him, a collection of fossil fruits from the *leads* of that district ; and immediately following this came a collection of similar fruits from Tanjil, in Gippsland. The same fossils occur also plentifully in the *leads* near Beechworth ; and to the zeal in the cause of science of Mr. R. Arrowsmith, the Department is indebted for many specimens in excellent preservation.

The value to science of the determinations of Baron von Mueller, the high importance to the geological enquirer of the results as given by him, and the great interest evinced by scientific men in Europe, and in other parts of the world, in these researches, have led me to submit in this form the first ten plates, and his descriptions, together with some special reports. The Geological Survey may be congratulated on having the cordial co-operation of a gentleman so eminent in science. He has superintended the preparation of the plates—admirably drawn by Mr. R. Shepherd—and written the descriptions in his leisure hours—extra work altogether outside of his labors as Government Botanist.

R. B. S.

Melbourne, 1st October 1874.

OBSERVATIONS
ON THE
NEW VEGETABLE FOSSILS OF THE
AURIFEROUS DRIFTS,

BY BARON FERD. VON MUELLER,

C.M.G., M.D., Ph.D., F.R.S.; Government Botanist for Victoria.

AMONG a number of vegetable fossils, discovered not long ago in the clays of the *leads* at Haddon (as shown in the accompanying plan and sections), and submitted to me for phytographic examination, the fruits of a coniferous genus, allied to *Cupressinites* of Bowerbank, seemed the most remarkable; hence this particular fossil has been selected as the first for elucidation on the present occasion. Some preliminary remarks on the discovery of these and some other fossil fruits were, by R. Brough Smyth, Esq., the Secretary of the Victorian Mining Department, and the writer, communicated to the Geological Society of London (see *Geo. Mag.*, page 390, 1870), and through those remarks the genus *Spondylostrobus* became established. The additional gain of more material from the place of discovery has not materially altered or enlarged the views which I entertained of the relationship of this genus, and I therefore now proceed to offer its full diagnosis.

SPONDYLOSTROBUS.

Strobilus woody, globose-ovate or almost spherical, with five, rarely four or six, thick longitudinal ribs, forming as many blunt prominent dissepiments, consolidated in the axis of the fruit; these costæ at the vertex furrowed by single grooves. Base of the strobilus naked. Valves five, rarely four or six, interjacent to the costæ, and by them widely separated from each other, erect, long appressed, fixed at the base, compressed-trigonal, the exterior face in outline oblong or lanceolar-oval, all nearly equal in size, and extending from the base of the fruit to about three-fourths its height, irregularly rough at the back, not keeled nor appendiculate. Cells five, rarely four or six, each bearing a single seed towards the centre of the fruit. Seed ovate, nearly half as long as the valves, very convex at the inner side, winged around the whole-margin, pendent from near the apex of the cavity, to which it is affixed, not always all developed.

I derived the generic name from *σπόνδυλος* (verticillus, whorl) and *στροβός* (strobilus, pine-cone).

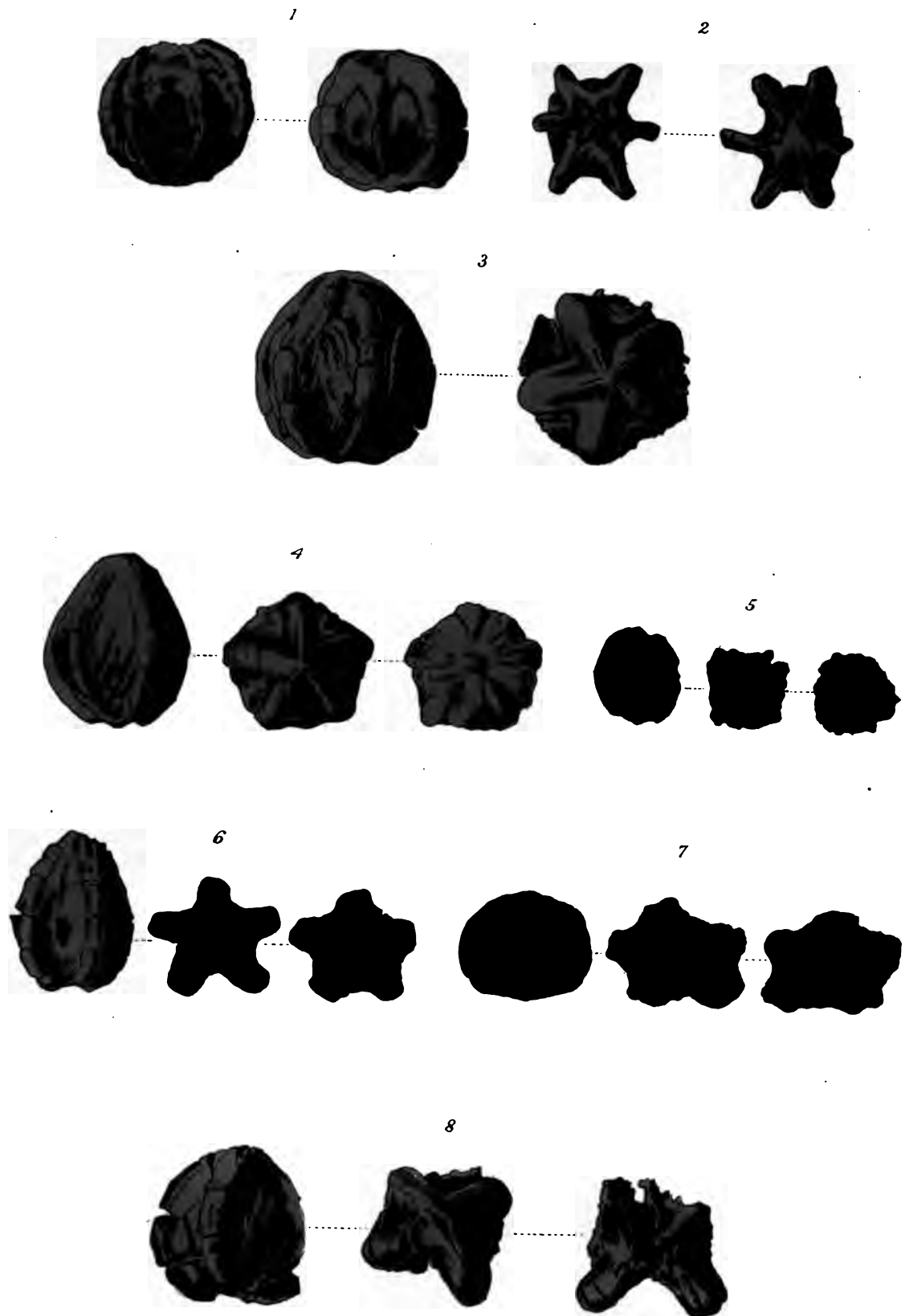
SPONDYLOSTROBUS SMYTHII.

The only species hitherto discovered I have dedicated to the gentleman who, as Secretary of our Mining Department for many years, has so widely augmented our knowledge of the mineral resources of our adopted country, and to whose consideration I owe the opportunity of glancing over the vegetable remnants referred to in these pages.

All the specimens, well illustrated by Major Shepherd on the accompanying page, seem to belong to one single species, variable in size and shape, but connected by intermediate forms. The leaves and amenta of the tree or shrub, which furnished these fruits, remain as yet completely unknown. The smallest fruits before me measure about two-thirds of an inch, the largest one inch and two-thirds. The ridges more attenuated and convex towards the base, wider and confluent at the summit. The wings of the seeds appear slightly outward directed, not exactly peripheral. The seed is perfectly free from the valve.

The validity of the genus rests chiefly on the extraordinary development of the columella, if so it may be called; this columellar portion forming indeed the main body of the fruit. In this respect *Spondylostrobos* differs from all other cupressineous genera, living as well as bygone. It shares the normally five-valved structure of the fruit only with *Solenostrobos* (Endlicher, synopsis *Coniferarum*, page 272, *Cupressinites*, Bowerbank, London Clay partly), but, as explained already in the diagnosis, this character of the number of valves is not absolute, though predominant, and thus vindicating the generic value of *Solenostrobos*. The species of the latter genus are, however, very distinct from *Spondylostrobos*, should even the augmentation of material from new sources induce us hereafter to unite generically the new fossil now reviewed with *Solenostrobos*. Access to Bower-

Plate 1.



bank's illustrated work (*History of the Fossil Fruits and Seeds of the London Clay*, 1840), obligingly afforded me by my venerable friend, the Rev. W. B. Clarke, the senior of Australian philosophers, proved beyond doubt that the enormous columellar receptacle of *Spondylostrobus*, on which the valves are sunk, is totally wanting in any of the four species of *Solenostrobus* figured. (Plate ix., figs. 22 and 23; also, plate x., figs. 24 and 25; also, figs. 28 and 29.) These illustrations indeed show sufficiently, that the margins of the fruit valves are contiguous, precisely as in the existing genus *Callitris*, and its sub-genera *Frenela*, *Actinostrobus* and *Octoclinis*; whereas in *Spondylostrobus* the fruit valves are rendered discontinuous by the intervening and protruding ridges of the receptacle. Excellent as Sowerby's drawings are, as furnished for Bowerbank's work, they give us no insight into the real inner structure of *Solenostrobus*, owing indeed to the scanty or imperfectly preserved material, not sufficient for examination, or too precious to be sacrificed in dissection. Another allied genus, *Passalostrobus* (Endl. syn. Conif. 278; *Cupressinites tessellatus*, Bowerb. Lond. Clay, page 53, plate x., figs. 26, 27, 30, 31), may perhaps indicate in its structure an approach to a columnar development beyond the summit, but not beyond the margins of the valves, should the central portion of the fruit be receptacular and not valvular. This the re-inspection of the original specimens can only explain. The doubts entertained by the learned Schimper in reference to the systematic position of *Solenostrobus* (Conf. Schimper traité de paléontologie végétale, tome seconde, 1870, page 358), are, by the discovery of our pentamerous conifer in Australia, now completely cleared away. Neither in his work, nor in Heer's still more recent elucidation of some fossil coniferæ (*Philos. Transactions of the Royal Society of London*, 1870, page 463, plate xli., figs. 10 and 11; also, plate xliii., figs. 4 and 5), are any additional plants recorded, to shed light on the pentamerous coniferæ from Sheppey, as regards their foliage and seeds.

In reference to the affinity of *Spondylostrobus* to existing coniferous plants, a comparison is possible only with *Callitris* and its sub-genera, because they alone exhibit likewise a simple vorticillus of fruit valves. In all the species of that genus, the columella is comparatively small or obliterated, and therefore no obstacle offered to the contiguity of their fruit valves. The seeds, moreover, are never in number less than two located at each valve, often more in number, sometimes numerous, while the valves are four, six, or rarely eight in normal number, never five. Absence of flowers, leaves, and perfect seeds of *Spondylostrobus* prevent us from carrying the comparison further. There is no other genus, recorded in the recent elaborate essay on existing coniferæ of the whole globe, as furnished by my illustrious friend, Professor Parlatores, for De Candolle's prodromus (pars xvi., 361-521), that could be regarded closely related to the fossil plant here under consideration.

EXPLANATION OF THE LITHOGRAM.

Plate I.—Fig. 1, a spherical fruit, of ordinary size, the valves removed to bring the seeds in view. Fig. 2, a fruit with dissepimental ridges, more than usually protruding, and with six valves and six septa; the summit and base in view. Fig. 3, side view and front view of a fruit of the larger variety, the commencing expansion of the valves discernible. Fig. 4, a more ovate fruit, presenting the side, vertex and base. Fig. 5, a small form of the fruit, moreover only four-valved, the edges of the dissepimental protrusions accidentally channelled by corrosion. Fig. 6, a fruit of almost oval shape, the side, top and base in view. Fig. 7, a fruit of depressed spherical outline. Fig. 8, fruits in a less perfect state of preservation. All the figures of natural size.

PHYMATOCARYON.

Fruit spherical, very rarely oval; outer pericarp thick, hard, externally smooth, adhering closely to the putaminous part of the fruit. Putamen capsular, three-celled or rarely two-celled, loculicidal three-valved or rarely two-valved; the valves completely separating to the base, in a dry state almost bony, externally very rough and deeply wrinkled from verrucular more or less confluent protuberances, not rarely somewhat protracted at the base. Septa usually not all well developed. One or two of the cells frequently empty. Seeds solitary in the cells, oblique ovate, turgid, rarely somewhat spherical, fixed to the summit of the cavity, pendent from the axis of the capsule. Testa smooth, thin, brittle.

The generic name is derived from *φυματώδης*, tubercular, and *καρυον*, nut.

Were I to hazard an opinion on the systematic relationship of this extinct genus, I should place it with Sapindaceæ. Among living genera of that order the pendent position of the seeds occurs also in *Hypelate* and *Doratoxylon*; the dehiscence of the fruit agrees with *Cupania* and several other sapindaceous genera; the tubercular roughness occurs also in *Mildea*, *Capura*, *Xerospermum*, *Euphoria* and *Nephelium*, while a distinct sarcocarp and putamen are found likewise in *Melicocca* and *Lepisanthes*.

Among fossil genera *Phymatocaryon* comes nearest to *Cupanoides*, *Tricarpellites* and *Wetherellia* (Bowerbank, *Fossil Fruits and Seeds of the London Clay*, pages 65-90, tab. xi. and xii.) The latter genus differs in the presence of a sac-like aril and septicidal dehiscence, but agrees with our genus in pendent seeds, if I rely on Bowerbank's apparently very accurate observations, no original material for re-examination or comparison being here locally available; yet it seems not impossible, that also in *Wetherellia* the more pointed or attenuated extremity represents the base of the fruit; if so the seeds would be erect. *Tricarpellites*, like *Wetherellia*, differs in dehiscence through the septa, and apparently also in wanting any separate outer fruit layer, besides in having erect seeds. The genus *Cupanoides*, whose number of species are evidently overrated, recedes from *Phymatocaryon* again in absence of a distinct thick outer pericarp, as also in erect seeds, while in size and shape the various forms of *Cupanoides* correspond well with such specimens of *Phymatocaryon* as have lost their sarcocarp. Further comparisons must be instituted from more perfect material, as only in a solitary instance the position and mode of attachment of the seeds of our fossil could be ascertained, whereas single observations on vegetable remnants like these are apt to lead to misconception. A secondary character, by which the new genus here described may at once be distinguished from any species of the three above named genera, consists in the remarkably

strong rugosity and warty roughness of the dorsal part of the fruit valves, although to this characteristic a slight approach is offered by *Carpellites rugosus* (Bowerb., l. c., pl. xi., figs. 41-44) and by *Cupanoides tumidus* (Bowerb., l. c., pl. xi., figs. 13-17). Not too much stress, however, must be laid on the occurrence of an additional outer coating of the fruit observed in *Phymatocaryon*, inasmuch as this crust was preserved only in two fruits among the considerable number of specimens which came under my examination; and even in these two cases the outer pericarp existed only fragmentary, to so small an extent indeed, that I should not have expected its existence in the absence of these two more perfect samples. This sarcocarp, if I have rightly recognised it, is evidently of a more perishable nature than the valves, and must have been in a recent state coriaceous or perhaps even succulent. Possibly it may yet be discovered in allied genera.

PHYMATOCARYON MACKAYI.

In auriferous drift of the older pliocene formation on Smythe's Creek, of Haddon goldfield, at a depth of about 150 feet. J. Lynch, Esq.

I dedicate this remarkable vestige of a plant, which probably formed a prominent feature in our forests of a former age, to the Honorable Angus Mackay, M.L.A., under whose ministerial administration of the Mining Department the discovery of this and many other fossils was effected, and under whose enlightened sanction a commencement was made in the elucidation of these particular relics of a vegetation rejoicing in a milder clime, and displaying forms of tropical grandeur now foreign to the spot.

The specimens of this fossil and others alluded to in this brief essay, as well as some more, which successively are to appear in our mining records, were obligingly placed at my disposal for examination by R. Brough Smyth, Esq., F.G.S., the Secretary of the Department of Mines of Victoria.

The illustration from the skilful hand of Major Shepherd renders a detailed description unnecessary. The fruits are sometimes vertically depressed, sometimes laterally compressed. The outer pericarp, which, in its dry state, becomes almost lignescent, is of about $1\frac{1}{2}$ line thickness; the dehiscence of the inner valvular part of the fruit takes place from the summit downwards. The thickness of the valves, according to the size of the fruit, which, in this respect, is as inconstant as that of *Wetherellia variabilis*, varies from $1-2\frac{1}{2}$ lines. The septum extends along the middle of the valves or is pushed out of the median line by the growth of the seed in the adjoining cell, or becomes obliterated; the septa meet in the axis of the fruit, but no columella remains after their separation. Very frequently only one seed is developed; the largest, measured by me, was nearly 5 lines long, but in small fruits the seeds attain not half that size; at the spot of attachment they are pointed. The seeds fill the cavity, and must thus have been devoid of any conspicuous aril, for which evidently no space was left in the cell. In some instances, when none of the seeds became well developed, the dissepiments are found to be enlarged and consolidated with the valves into an equable mass, so much so, that the septa, by becoming

contiguous, give to the dehiscence a septicidal appearance. The inner structure of the seeds remains unascertained, they having hardened into iron pyrites and thus been rendered amorphous. Stem, leaves, and flowers of this bygone tree remain unknown.

EXPLANATION OF LITHOGRAM.

PLATE II.

PHYMATOCARYON MACKAYI.—Fig. 1, lateral view of two empty valves of a large trilobular fruit. Fig. 2, fruit of middle size, presenting the side summit and base; one of the valves shown separately. Fig. 3, a larger fruit, and its three valves disconnected. Fig. 4, a fruit with a portion of the outer adhering pericarp yet preserved. Fig. 5, fruit presenting its summit and side, also the cavities of its three separate valves; the cells of unequal size. Fig. 6, fruit exhibiting its vertex and side and its valves, the latter in part transversely fractured; also two separate seeds. Fig. 7, views of a seed of large size, perfect in form. Fig. 8, two valves of a small three-celled fruit, one seed preserved in its natural position. Fig. 9, single valves of a small two-celled fruit, each containing a perfect seed. Fig. 10, fruit somewhat deformed, without fully distinct valvular dehiscence. Fig. 11, a small less warty fruit, remarkably depressed, presenting summit, base and side. Fig. 12, a small almost oval fruit, the summit and side shown. Fig. 13, the valves of a two-celled fruit, one cavity larger than the other. Fig. 14, a smaller two-valved fruit. Fig. 15, a fruit of minute size.

TREMATOCARYON.

Fruit globular, bony, one-celled, one-seeded, from the vertex bursting about half downward into two valves, outside irregularly and longitudinally but only faintly furrowed, at the base deeply perforated by an oval aperture; the latter divided by a strong somewhat attenuated dissepiment into two spurious narrow basal cells, not communicating with the main cavity of the fruit. Cavity depressed-spherical, with an ample round cicatrix occupying its lower part and indicating the position of a solitary seed, attached with much of its lower half to the basal part of the cavity. Testa membranous, smooth, shining.

The generic appellation is obtained from *τρῆμα*, hole, and *καρυὸν*, nut, in allusion to the basal perforation of the fruit.

In the short memoir, which appeared in the *Geological Magazine* of 1870, page 390, I assigned, from a solitary fruit, to this fossil a position among Verbenaceæ, not wishing to sacrifice the only specimen, then available, in analysis. A few other fruits of the same species have since been found, enabling me to give the above generic account, though yet so imperfect. My original view on the affinity of Trematocaryon continues undisproved; but the inspection of the inner structure of the fruit reveals in the broadly sessile seeds a character which appears to point to Sapindaceæ, and seems to indicate the very wide hilum of Sapindus, Cupania, Nephelium, and numerous genera closely allied to them. No genus, however, of the latter order comes near to ours, while the basal openings of the fruit certainly remind of some Verbenaceæ, such as Cornutia, Petitia, Lantana, Gmelina, Premna, Pityrodia, Casselia, Citharexylum and Newcastleia, although it must be admitted, that the basal intrusion is not analagous in all these cases. But I am not acquainted with any genus among living or fossil plants to which Trematocaryon bears any very close alliance,

Plate 11.

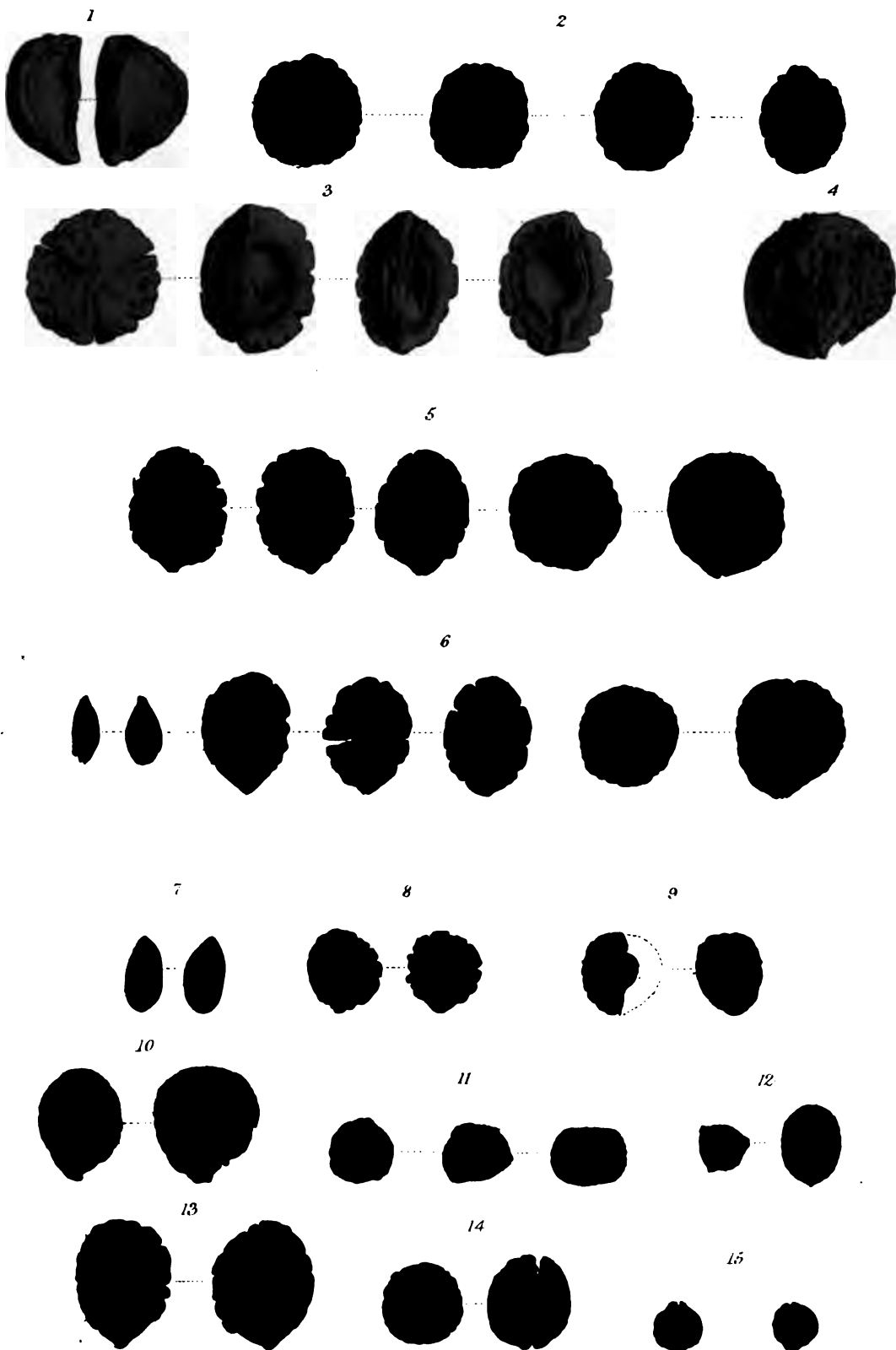
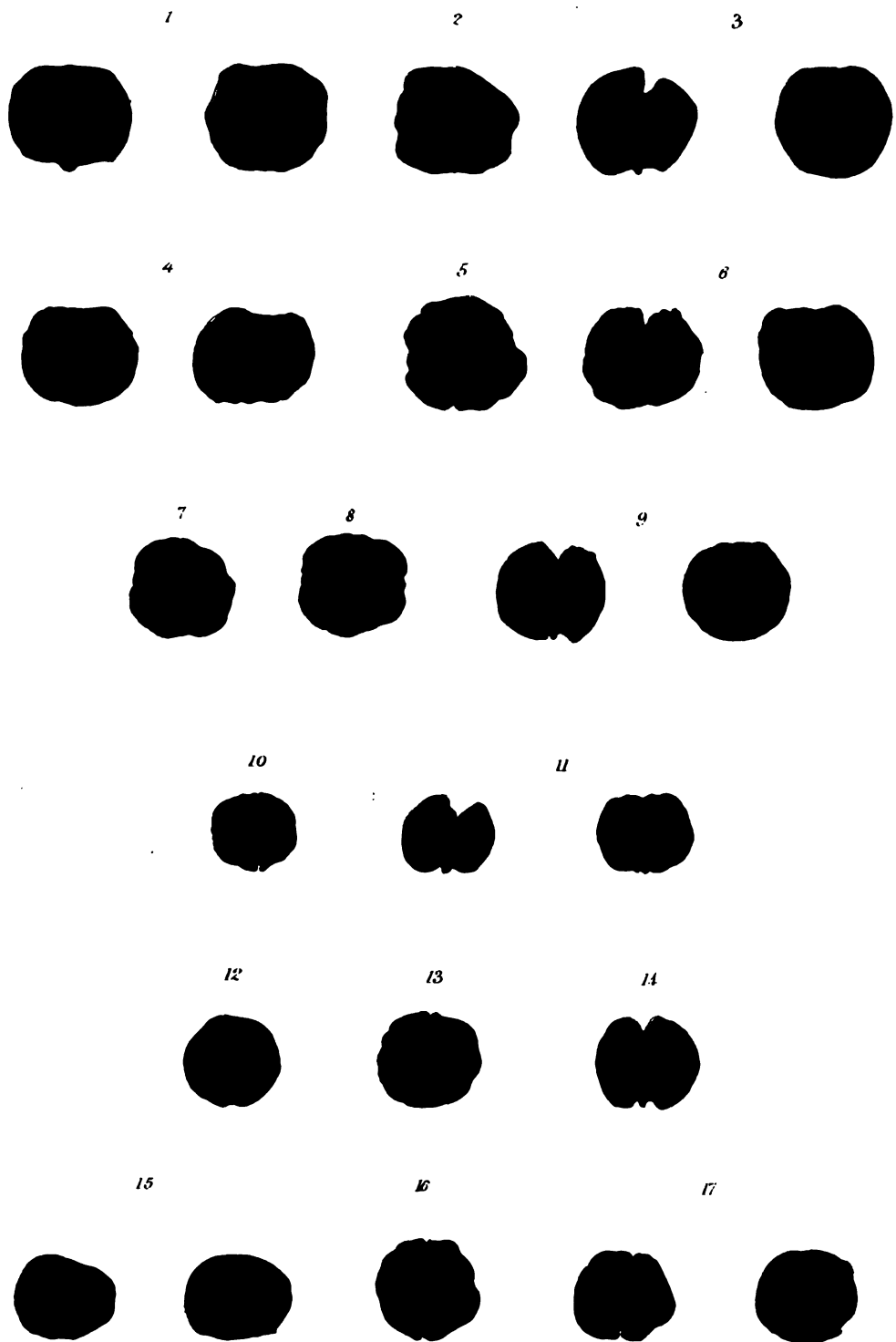


Plate III



and thus its systematic position remains to me obscure, although I endeavoured, from our yet extremely limited knowledge of this bygone plant, to indicate some of its possible affinities. It is scarcely necessary to repeat also, on this occasion, that palæontologic writings like these are offered more with a view of bringing strange remnants of animal or vegetable life to notice for further searches, or for ampler comparison, or for the recognition of the ages of geologic formations, than to venture a full opinion on their definite alliance, or to come at once, or perhaps ever, to final conclusions as to their absolute affinity. Yet remarks on new scientific material, however fragmentary, may help also to indigitate the path of further enquiry; or, by drawing attention to the incompleteness of our knowledge in instances of this kind, we may secure from circumspect observers, who are placed favorably, that additional material, which may give us an insight into circumstances, which may prove of unforeseen significance.

TREMATOCARYON McLELLANI.

In auriferous drift of the older pliocene formation of Haddon goldfield, at Nintingbool, about 150 feet below the surface. J. Lynch, Esq.

The only species of Trematocaryon is dedicated to the Honorable William McLellan, M.L.A., for several years Minister of the Mining Department, under whose authority this unpretensive essay has passed to publicity. This dedication is also intended as a public mark of recognition of the support, which this respected gentleman in his legislative position has always accorded to the labours of the writer.

Beyond the portions of the fruit described and illustrated, nothing of the plant is known; it is likely that the fruit was yielded by a tree or large shrubby plant. The dehiscence of the capsule is not along a well indicated suture; hence the edges of the valves are uneven. The cavity is invested with a fulvous membrane, broadly adnate at the base, and representing, as far as can be judged, the testa and not an arillar appendage.

EXPLANATION OF LITHOGRAM.

PLATE III.

TREMATOCARYON McLELLANI.—Figs. 1, 4, and 15, fruit laid open, showing the remnants of the testa, also the broad basal cicatrix, to which the seed was fixed. Figs. 2, 5, 8, 10 and 13, various specimens of the fruit, showing its base. Figs. 3, 6, 9, 11, 12, 14, and 17, side view of various specimens of the fruit, in their erect position. Figs. 7 and 16, fruits showing their vertex.

All the figures are indicating natural dimensions.

My illustrious friend, Professor McCoy, who kindly inspected these fossils, concurs in my opinion, that they represent forms previously undiscovered; and I feel honored, that so learned a palæontologist, who studied for many years here and in Europe the organic relics of bygone ages, has conceded to me the privi-

lege of examining such other species of Victorian fossil plants, as stand in close relationship to existing vegetation. I fully agree with Professor McCoy, that on mere fragments of leaves, or on other most imperfect or ambiguous material, no generic nor even ordinal characteristics should be founded; and I believe that the true purposes of science in instances of this kind are served by illustrating such relics simply by drawings left unnamed, inasmuch as records thus limited will be quite sufficient, until the occasion may arise for securing to the respective species safe positions. But if any knowledge which I may possess of the vegetable life of the existing creation can aid in restoring from scattered fragments specific forms, as zoologic science has often so lucidly done from the mere fragments of bones, then I shall gladly share here in such a task, alike important and honorable.

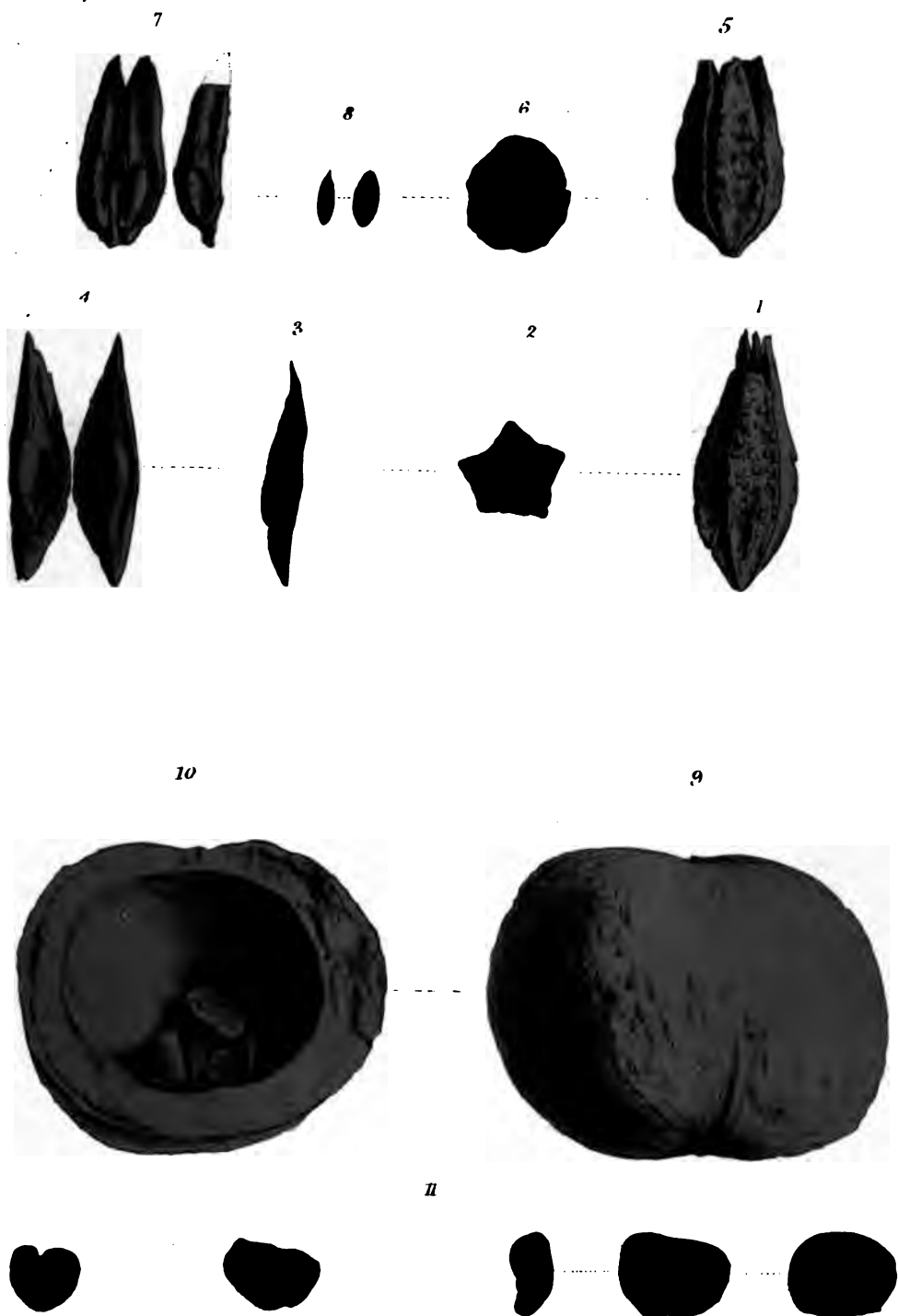
RHYTIDOTHECA.

Capsule woody, elongated pentagonous-ellipsoid, very gradually attenuated towards the acute apex, less pointed towards the base, by loculicidal dehiscence completely dissolving into five solid valves; the latter wrinkled and rough at their dorsal portion; a slight furrow along their internal edge. Columella or free central axis absent. Seeds turgid, solitary in each cell or perhaps two superposed, only in part coming to full development, lodged either slightly below the middle of the valves or at within one-third of the summit of the capsule, but seemingly only in the former case advancing to maturity. Above and below the well defined oval cavity, formed for the reception of the nucleus-portion of the seed, are impressions indicating a prolongation of the seed upwards and downward into some long and narrow probably wing-like appendicular organ, of which, however, in the specimens, hitherto found, no traces are left. The seeds were only seen in a rudimentary state; thus their point of attachment could not be ascertained with positive accuracy.

The generic name is obtained from *ρυτιδῶδες*, wrinkly, and *θήκη*, capsule.

The fruit bears some resemblance to that of *Flindersia Strzeleckiana* (F. M. *Fragm. Phytogr. Austr.* i. 65), but this similarity is an external one mainly. *Rhytidotheca* is in reality more closely allied to the genus *Chloroxylon* (the only species of which yielding the beautiful East Indian satinwood, commercially and industrially so well known). The absence as well of a free central axis as of laminar placentæ and the loculicidal dehiscence bring our

Plate IV



fossil nearer to *Chloroxylon*, while the division of the capsule into five valves indicates an approach to *Flindersia*. In the turgidity of the seeds *Rhytidotheca* differs from both, and besides in the paucity of seeds from *Chloroxylon*. Moreover the capsules of the various *Flindersiæ* are more or less echinulate-tubercular, while the capsule of *Chloroxylon* is smooth; again the verrucular prominences of *Rhytidotheca* are so slight as to render the capsule hardly more than rugose. What relation the foliage and flowers may have had to the above mentioned existing *Meliaceous* trees is entirely involved in obscurity. How far again an alliance to *Sapindaceæ* or some other orders with woody valvular fruit can be traced out, future researches from more enriched material must demonstrate; but in any comparisons with *Sapindaceæ* the number of fruit-valves, increased to five, remains exceptional.

RHYTIDOTHECA LYNCHII.

In the auriferous deposits of the older pliocene formation of the goldfields of Haddon, at Nintingbool, about 150 feet below the surface. J. Lynch, Esq.

This fossil is dedicated to the officer, who by successful and strenuous exertions secured this species and many other palæontologic remains, which are under progress of elucidation for the valuable documents of the Mining Department, periodically issued by R. Brough Smyth, Esq.

It may be worthy of remark, that no member of the *Meliaceous* order exists any more in the living vegetation of our colonial territory. This newly discovered remnant of a past flora again indicates a clime formerly warmer and more humid and equable than that of the spot where now these vestiges of extinct forests are buried.

From the same locality, in which the adopted normal form was found, we possess an allied fossil, which probably constitutes merely a variety of the species above defined; the outer rugosity of the fruit is less manifest, and the nucleus of the seed is lodged at the base of the cell or near the base; thus necessarily the space for the expansion of the wing exists only upwards, and this, as indicated by the impression, forms a terminal gradually narrowed appendage fully twice as long as the seed. The nucleus is ellipsoid and nearly 3 lines long. The collection contains also what appears to be another variety of the same species, the form of the capsule being more ovate and the diameter rather more than half the length of the fruit.

EXPLANATION OF LITHOGRAM.

PLATE IV.

RHYTIDOTHECA LYNCHII.—Fig. 1, the capsule unopened; side view. Fig 2, the same, presenting the base. Figs. 3 and 4, three valves, separated, showing the cavities for the reception of the seeds. Fig 5, the unopened capsule of the variety with basal seed; side view. Fig 6, the same, presenting its summit. Fig. 7, three valves of the same, separated. Fig. 8, detached seeds, their form restored from fragments.

PLESIOCAPPARIS.

Fruit depressed-globular, one-celled, indehiscent, slightly oblique, somewhat rough outside. Pericarp crustaceous-woody, rather smooth inside. Cavity ample, traversed on two sides, but there from the base to near the summit, by the remnants of slightly spreading placentas. Seeds several, probably numerous, more or less heart-shaped or renate, somewhat twisted, convex and rather smooth on one side, on the other face bearing irregular impressions.

The generic name is formed from *πλησιος*, indicating affinity, and *καππαρις*, the Caper-bush, in allusion to the resemblance of this fossil to the large fruits of some species of *Capparis* of the *Busbeckia* section. In selecting the generic designation I did not wish to indicate thereby the real affinity of this genus, which remains dubious, although the form of the fruit and the shape of the seeds seem to point, perhaps deceptively, in the direction of *Capparis*.

PLESIOCAPPARIS PRISCA.

From the Haddon lead, with *Spondylostrobus*, *Phymatocaryon*, *Trematocaryon* and *Rhytidotheca*. John Lynch, Esq.; communicated by R. Brough Smyth, Esq., F.G.S.

The fruit is fully 2 inches in diameter. The pericarp has a thickness from 3 to 4 lines, and is hard, almost bony. The seeds measure from $\frac{1}{3}$ to $\frac{1}{2}$ inch. Three were found in the solitary fruit which I opened, but besides there existed some undeveloped ovules with these seeds. The cavity is slightly invested with the residue of a probably pulpy mass, which became indurated into thin lamellar strata. The structure of the embryo can no longer be ascertained, it having become by fossilification homogeneous, but appears from the shape of the seeds to have been twisted or coiled. The placentas, as indicated by a band of somewhat ramified cicatrices, stretch from the base in two lines towards the summit, apparently in a similar manner to that of *Capparis Mitchelli*, which shows also two placental cicatrices stretching along the walls of the pericarp nearly from the top to the bottom, as observable after the removal of the pulp.

If at all a comparison with any *Capparis* should be admissible, then it would be with the already mentioned large-fruited *Capparis Mitchelli* (Lindl. in Mitchell's Three Expeditions, i. 315), a desert tree, extending from the Murray-River nearly to Carpentaria and Arnhem's Land. On the inspection of the plate in my work on the Plants Indigenous to Victoria, Suppl. Pl. iv., it will be found, that the pericarp of *Plesiocapparis* is considerably thicker and that the seeds are larger and less regularly cordate-renate. Flowers and leaves of this fossil remain unknown, and thus the comparison cannot be carried further, at least for the present.

EXPLANATION OF LITHOGRAM.

PLATE IV.

PLESIOCAPPARIS PRISCA.—Fig. 9, fruit unopened, like the rest of the figures given in natural size. Fig. 10, fruit laid open, loose seeds within. Fig. 11, seeds, the three connected figures illustrating the same seed seen from different sides.

McCoyi, or whether (as I can hardly anticipate) it forms a distinct species of the same or of an allied genus, must remain for the present undecided. This fruit-specimen is fully 2 inches long, slightly attenuated at the summit and much contracted at the base.

As an abnormal form I referred also temporarily to this species the fossil, of which a drawing has been given at fig. 4; the inequality of the thickness of the pericarp seems singular but may be accidental; the cavity in this instance is spherical.

EXPLANATION OF LITHOGRAM.

PLATE V.

CELYPHINA MCCOYI.—Fig. 1, a fruit of normal form. Fig. 2, the same presenting its lateral aspect. Fig. 3, the same laid open, containing crystalline infiltrations. Fig. 4, dorsal and side view of a smaller variety; the same also laid open. Fig. 5, a variety with roundish cavity. Fig. 6, a larger fruit, probably conspecific, but much protracted at the base. Fig. 7, transverse section of the latter.

All figures of natural size.

ODONTOCARYON.

Fruit indehiscent, thick-woody, unilocular, one-seeded, ovate-globular in outline, somewhat oblique, slightly compressed, terminated into four large somewhat unequal teeth; the latter from a broad base gradually acutely conical, but not very angular, surrounding the deep depression of the vertex of the fruit; two teeth on one side of the fruit strictly erect; the two others slightly longer and distinctly bent inward. Seed pendent, ovate, turgid, upwards somewhat more attenuated and compressed.

The name is derived from *ὀδους*: tooth, and *καρυον*: nut.

ODONTOCARYON MACGREGORII.

In the auriferous drifts near Nintinbool, at a depth of about 150 feet. J. Lynch, Esq.

The specimens as yet found are nearly $1\frac{1}{2}$ inches long, and slightly exceed 1 inch in diameter; the larger terminal teeth are about $\frac{1}{2}$ inch long; the vertex is perforated, probably through disintegration. The seed fills the cavity, measures nearly $\frac{2}{3}$ of an inch in length; its structure can no longer be ascertained.

This remarkable fossil, derived probably from a large evergreen tree, is dedicated to the Honorable John Macgregor, M.L.A., one of the first Ministerial administrators of the Department for Mines, and one of the most enlightened among the patrons of science in this part of the globe.

The writer has not ventured to refer this fossil to any natural order, being unaware of any existing or extinct genus to which it bears really close resemblance; but he would also frankly admit, that the young institutions of this colony are as yet affording, both in collections and in libraries, only very inadequate aid and material for independent local contributions towards the knowledge of the organic world; and although the writer's whole private means for a long series of years have been sunk in his researches, they have been too slender to provide for all the auxiliary requirements of his studies here, more particularly concerning palæontologic work.

Plate V

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CONCHOTHECA.

Fruit bony, roundish, considerably compressed, smooth, slightly oblique, bi-valved, one-seeded, short-apiculate at the summit. Cavity on each side very shallow, cordate-orbicular. Seed flat, roundish.

Derivation of the generic appellation from *κογχος*: shell, and *Θηκη*: capsule.

CONCHOTHECA ROTUNDATA.

In the drifts of the older pliocene formation at Nintingbool. J. Lynch, Esq.

The specimen now illustrated measured hardly $\frac{3}{8}$ of an inch. The pericarp is about 1 line thick, except towards the lower extremity, where it is more enlarged.

The general appearance of this fruit reminds of that of several *Grevilleæ*, for instance, *G. refracta*, *G. polystachya* and *G. mimosoides*; but in all these the fruit is larger, shows a wider cavity, and is provided with a conspicuous stipes. By this comparison *Conchotheca* is not even yet admitted to a settled place among *Proteaceæ*. The *Grevilleæ* above referred to are all tropical, and we have in this colony no species living now, which bears resemblance to the fossil compared.

On former occasions already, when assigning systematic positions to Victorian fossils, I adhered to the principal of drawing rather new generic limits for fossil plants known only from extremely fragmentary remnants, than of risking the danger of arraying a bygone species within the same generic precincts with living ones, whenever the generic characters could not be clearly identified. For I do not consider it a real gain of knowledge, when well understood genera of living plants are overburdened with fossil species on the evidence of perhaps only one single organ of a perished plant, moreover when that one organ may not be exclusively characteristic of the genus thus adopted, or not even of the order to which such a genus belongs. Acting on this principle, I have preferred to constitute separate generic limits for the fossil under review on this occasion, instead of placing it directly into the genus *Grevillea*, as understood in the living vegetation. Nevertheless I have felt justified in comparing it with species of that genus, leaving the final determination until leaves, flowers and seeds shall have become known.

In the collections from Nintingbool fragments occur of an apparently specifically identical fruit, but they exhibit a smaller variety, barely $\frac{1}{2}$ an inch long; the shallow cavity becomes in this almost orbicular. The flat seed measures hardly above 2 lines, is thin and also orbicular. As certainly congeneric, but probably not conspecific, should not be passed on this occasion the single valve of a much larger specimen from the same sediment; it measures $1\frac{1}{3}$ inch in length, verges slightly towards an oval form, while its walls are fully $\frac{1}{4}$ of an inch thick.

RHYTIDOTHECA PLEIOCLINIS.

Capsule small, woody, generally eight-valved, oval, blunt at the base, impressed at the summit; the edges of the valves meeting to form as many prominent longitudinal ridges as there are valves; the back of the latter slightly hollowed or channelled, not quite even, though also not distinctly tubercular or warty; the sides

of the valves longitudinally excavated towards the axis for the reception of the seeds; the latter solitary, erect, arising from the base of the cavity, turgid, elongated, wingless, slightly curved.

In the drifts of the lower pliocene formation at Nintingbool. J. Lynch, Esq.

Fruit varying in length from 4 to 7 lines, comprising a larger and smaller form. Seeds smooth, not developed between every pair of valves; those of the larger form nearly $\frac{1}{2}$ inch long and fully a line wide, not conspicuously dilated upwards; those of the smaller form hardly $\frac{1}{4}$ inch long and of about $\frac{1}{2}$ line thickness. In some cases, when the seed is but slightly developed, the shining walls of the cell are obliquely transverse-striated, assuming an appearance as if numerous ovules were arranged along the axis.

This fossil has been placed in the genus *Rhytidotheca*, as established in the third quarterly report of the Mining Department for 1871, issued by R. Brough Smyth, Esq. On comparison of Major Shepherd's excellent drawings, it will be observed, that the present species has much smaller fruits than *Rhytidotheca Lynchii*, that the apex of the capsule is not attenuated, and that the numbers of the valves are more than five. As both fossils came from the same geologic formation and locality, and as they show considerable structural similarity, it was deemed advisable to keep them generically together, until we learn more of the two plants, yielding us as yet only the recorded remnants. Should the new fossil finally require generic separation, then its specific name might become that of the genus.

It remains worthy of note, that a two-valved capsule, evidently of ordinal and perhaps even of generic affinity to *Rhytidotheca* or *Pleioclinis*, occurs in Mr. Lynch's collection, but only in a single specimen. It is oval, moderately compressed, particularly upwards, nearly 1 inch long; the outside is wrinkled-tubercular, and may have been verrucose before it was subject to detritus. The seeds are wingless, conspicuously turgid, especially downward, solitary in each cell, narrow-ellipsoid, somewhat obverse-cuneate, attached at their middle to the axis, and about $\frac{1}{2}$ an inch long.

All these fossils also on this occasion have been placed obligingly at the disposal of the writer by R. Brough Smyth, Esq., F.G.S.

EXPLANATION OF THE LITHOGRAM.

PLATE VI.

RHYTIDOTHECA PLEIOCLINIS.—Fig. 1, vertical view of the capsule. Fig. 2, side view of the capsule. Figs. 3 and 4, valves of the larger form.

ODONTOCARYON MACGREGORII.—Fig. 5, side view of the fruit. Fig. 6, vertical view of the fruit. Fig. 7, the fruit opened lengthwise to show the side and position of the seed. Fig. 8, seed, detached.

CONCHOTHECA ROTUNDATA.—Fig. 9, side view of the fruit. Fig. 10, fruit, presenting its edge. Fig. 11, fruit opened lengthwise.

All figures of natural size.

PENTEUNE.

Fruit five-valved to the base, ovate-globose or broadly ovate; dehiscence loculicidal; valves exceedingly thick, woody, very slightly rough on the dorsal part. Cavity towards the middle part of the valves. Free central axis absent. Cells five in number. Seeds solitary in each cell, towards their summit attached

PENTEUNE TRACHYCLINIS.

Fruit comparatively large, roundish, externally very rough, almost verrucular; cavity of the valves sometimes very deep.

Occurs with the two foregoing.

This has been illustrated for completeness sake on this occasion, but merely from the fragments of two specimens, it being desirable to exhibit together the full series of allied species or of varieties, so far as hitherto known. From *Phymatocaryon Mackayi* this fossil fruit is at once distinguished by the number of the valves.

Figs. 13-17 in Plate VIII. of Major Shepherd's faithful drawing represent a state of the same fossil, but much compressed, probably through distortion in a young state.

EXPLANATION OF LITHOGRAMS.

PLATE VIII.

PENTEUNE BRACHYCLINIS.—Figs. 1, 2, 7, side views of the whole fruit. Figs. 3, 4, fruit dissected longitudinally. Figs. 5, 6, side and back view of a seed. Fig. 8, fruit presenting the summit. Fig. 9, inner side view of separated valves.

PENTEUNE TRACHYCLINIS.—Figs. 10, 12, fruit dissected longitudinally. Fig. 11, two valves, presenting the summit. Figs. 13, 14, side view of the whole fruit in a compressed state. Fig. 15, the same presenting the summit. Fig. 16, inner side view of a valve with a young seed. Fig. 17, inner side view of an aged valve. All figures drawn according to natural dimensions.

DIEUNE.

Fruit bi-valved to the base, globular, smooth; valves thick, hard, almost bony; cavity central; septa none. Placenta parietal, thinly filiform, traversing in a single line the middle of each valve longitudinally. Ovules oblong, four to each valve, attached at about equal distances to the placenta. Seeds unknown.

The name of the genus—from *δις* and *εὐνή*—is selected in reference to the valves of the fruit, only two, on which the seeds are lodged.

The position of the ovules, not sutural, removes this genus from *Proteaceæ*, although external resemblance is pointing to the woody-valved *Grevilleæ*. Its true alliance must perhaps be sought among *Capparidæ* or *Pittosporæ*; but in the absence of the foliage and floral organs the exact systematic position of this probably arboreous plant must remain unsettled for the present. The perfectly valvular fruit separates this genus most readily from *Plesiocapparis*.

DIEUNE PLURIOVULATA.

In the deep drifts of the older pliocene formation at Haddon. John Lynch, Esq.; communicated by R. Brough Smyth, Esq., F.G.S.

As yet only two samples of this fossil have been found; one consists of a single valve showing the number of ovules as stated in the description; the other specimen, of which both valves are extant, exhibits no traces of the ovules. Both these fruits measure somewhat less than one inch; one is quite turgid; the other is slightly compressed; a faint channel communicates from the base of the capsule through the pericarp with the lower extremity of the placenta. Major Shepherd's creditable drawing renders a further description superfluous.

Plate VII

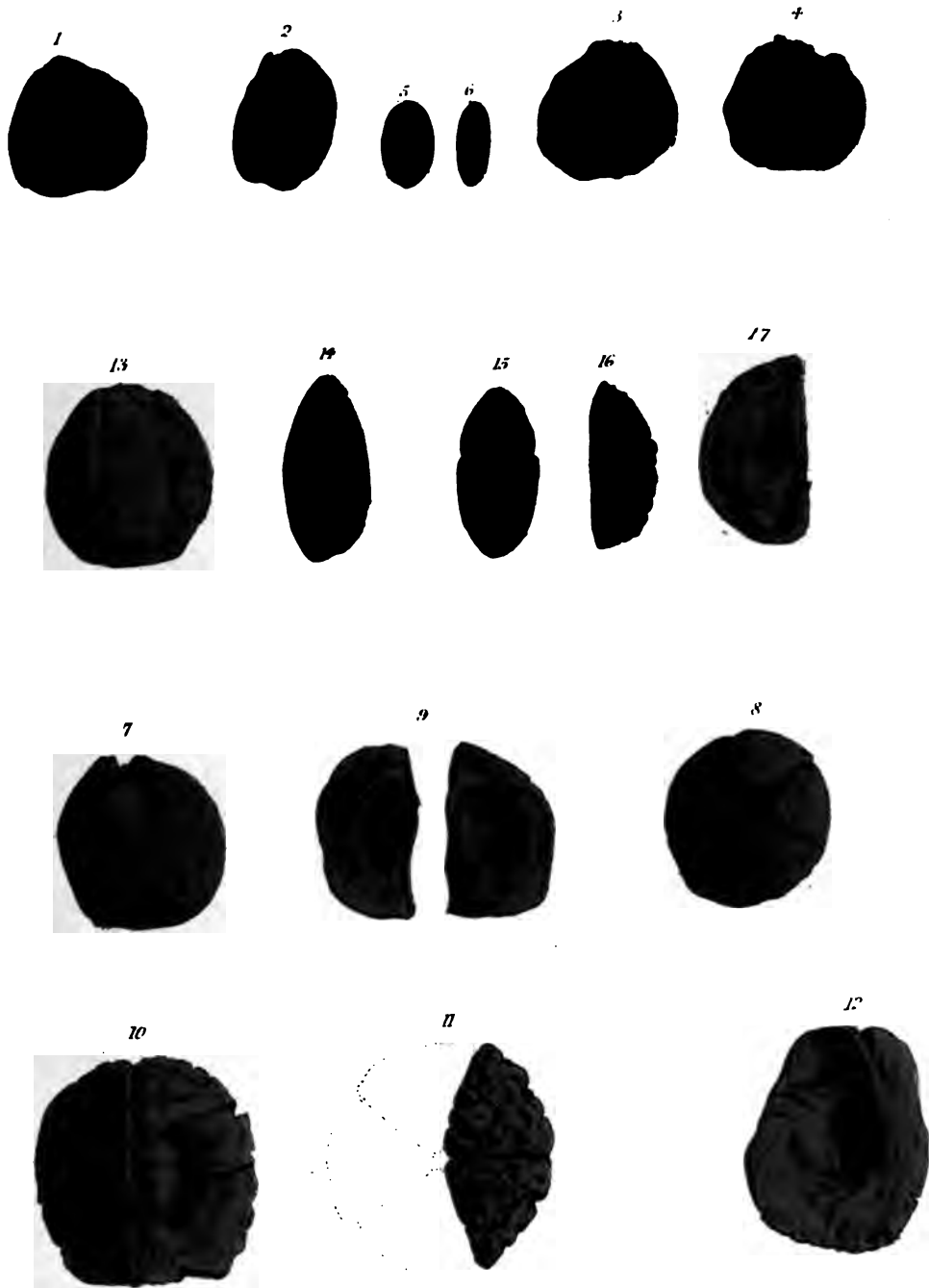
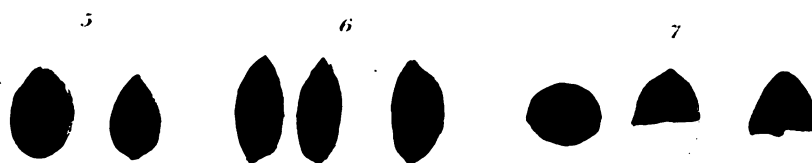
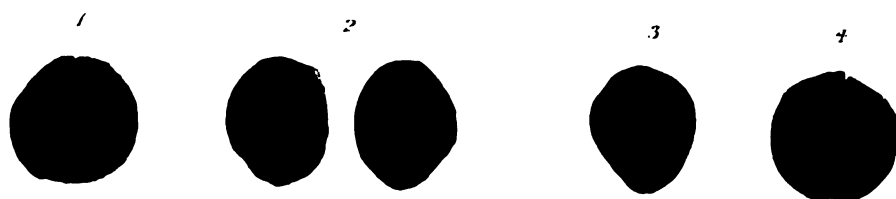


PLATE IX



PLATYCOILA.

Fruit bony, egg-shaped, slightly rough outside, separating into two valves; septa none. Cavity sideways, widely expanded. Seed smooth, solitary, basifixed, arising from the bottom of the cavity, sessile, in its immature state oblong-oval.

The generic name—from *πλατυς*, broad, and *κοιλα*, hollow—alludes to the ample cavity of the capsule, which on transverse section represents a cordate or almost renate outline, and affords thus a characteristic mark by which this genus can be recognised without difficulty in comparison with *Conchotheca*. It would be unsafe to effect the union of both, especially as we do not yet possess the leaves and flowers for demonstrating generic discrepancies or analogies.

PLATYCOILA SULLIVANI.

In auriferous drifts of the older pliocene strata, near Nintingbool. J. Lynch, Esq.; communicated by R. Brough Smyth, Esq., F.G.S.

This fossil plant received its specific name in commemoration of the Ministerial administration of the Victorian Department of Mines for a lengthened period by the Honorable J. F. Sullivan, M.L.A.

Fruit varying in length from $\frac{1}{3}$ to $\frac{2}{3}$ of an inch. Pericarp comparatively thick, turgid on all sides, but more so in its ventral than its dorsal portion. Mature seeds unknown.

This fossil is particularly deserving further attention of residents in the district where it was disinterred. Both the definition and drawing had to be effected from very fragmentary remnants. A single valve apparently of this species occurs among the fossil fruits recently sent from the River Tanjil.

EXPLANATION OF LITHOGRAMS.

PLATE IX.

DIEUNE PLURIOVULATA.—Fig. 1, a single valve in a reversed position, exhibiting the ovules attached to the placenta. Fig. 2, two valves of a slightly compressed fruit, presenting the inner side. Fig. 3, dorsal view of a fruit before the separation of its valves. Fig. 4, lateral view of the same.

PLATYCOILA SULLIVANI.—Figs. 5-9, five fruits of natural size, showing respectively the surface and cavity, also the valves separately; and, in Fig. 9, exhibiting the seed.

All drawings of natural size.

PHYMATOCARYON ANGULARE.

Valves three, roundish-ovate in outline, somewhat acute, irregularly rough but not distinctly warty on the outside, forming a prominently triangular capsule.

In the deep drifts at Smythe's Creek in older pliocene strata. J. Lynch, Esq.; communicated by R. Brough Smyth, Esq., F.G.S.

The description and drawing are from a solitary specimen, long laid aside by me with a hope of obtaining additional material for the study of this species. Such not having been gained in the course of several years, it was deemed advisable to

place this fossil fruit now on permanent record. If the absence of a sarcocarp in this species and its undoubted presence in *Phymatocaryon Mackayi* can be proved, then the separation of this new one from the genus, in which it is provisionally placed, will become unavoidable; the structure, however, of the valves and the attachment and form of the seeds are congeneric, as may be observed on reference to Major Shepherd's accurate delineation. The length of the fruit is nearly 1 inch, that of the seeds 3 to 4 lines. Some external resemblance to the fruit of *Penteune brachyclinis* is apparent; both, however, are distinguished easily by the number of their valves.

It may be of interest to add on this occasion, that the typical *Phymatocaryon Mackayi* has more recently been found in at least one locality of New South Wales, according to specimens transmitted by the Rev. W. B. Clarke, also on the River Tanjil and at Eldorado, near Beechworth. In all these places it is accompanied by *Spondylostrobus Smythii*; while the collections formed by R. A. F. Murray, Esq., on the River Tangil, when that gentleman was engaged there as geological surveyor in departmental work, have demonstrated that likewise *Platycoila Sullivani* and *Celyphina McCoyi* occur on that river; we may therefore now assume, that at the early pliocene period these trees were constituting a main portion of the forests over very wide tracts of South-East Australia, impressing features on the landscape singularly different from those of the present era of vegetation under our geographic latitudes and meridians. At the Eldorada mines, near Beechworth, likewise *Penteune Clarkei* and *P. trachyclinis* as well as *Trematocaryon McLellani* have shown themselves, according to collections lately transmitted by R. Arrow-smith, Esq., mining surveyor, Chiltern. The hitherto so rare *Odontocaryon Macgregorii* has also now been sent in several specimens from the last mentioned place; hence we have learnt, that its fruit assumes occasionally an oval form, that it develops sometimes as many as three collateral seeds, and that the teeth of the pericarp are often all bent inward, thus forming almost valves to the apex of the fruit. The testa is shining, very minutely and closely dotted, whereby the most subtle reticulations arise on the surface of the seeds.

CONCHOTHECA TURGIDA.

Fruit small, very turgid; valves acute at the edge, outside often distantly wrinkled; cavity deep, roundish; testa smooth, shining.

At Nintingbool in the older pliocene drift; also at the Tanjil.

The fruit measures from $\frac{1}{2}$ to $\frac{2}{3}$ of an inch in length. Not unfrequently one of the valves traversed for about one third of its length by a keel-like prominence.

Of the several new localities, from which fossil fruits were latterly gained none as yet has yielded us any species additional to those which were brought to light at Nintingbool; nor up to this time has the result of various local searches enabled us to elucidate these bygone forms of vegetable life, in reference to the nature of their foliage and their floral organization. The field of discovery remains therefore yet open, not merely in this respect, but it seems also most probable that the plants, which have been defined carpologically in these pages, were constituting only a small

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Plate X



proportion of the sylvan vegetation, which, under a once milder sky, must have been singularly varied and exuberant, and in such a case most traces of these perished forests remain as yet concealed from us.

EXPLANATION OF LITHOGRAMS.

PLATE X.

PHYMATOCARTON ANGULARE.—Fig. 1, side view of the unopened fruit. Fig. 2, unopened fruit, presenting its summit. Fig. 3, fruit opened lengthwise, presenting its three cells, one containing a seed, suspended from the apex of the cavity. Fig. 4, seeds seen separately.

CONCHOTHECA TURGIDA.—Figs. 5, 9, side view of the whole fruit. Figs. 6, 10, whole fruit presenting the apex. Fig. 7, whole fruit presenting the base. Fig. 11, whole fruit presenting the sutural edge. Figs. 8, 12, valves separated, in 12 with a shrivelled seed.

All figures of natural dimensions.

SPECIAL REPORT ON THE NEW VEGETABLE FOSSILS
DISCOVERED NEAR ORANGE, N.S.W.

BY BARON VON MUELLER, C.M.G., M.D., Ph. D., F.R.S., &c., &c.

Melbourne, 29th July 1874.

SIR,

I have the honor to acknowledge the receipt of your communication of yesterday, accompanied by fossil fruits obtained at Orange, in New South Wales, and so thoughtfully transmitted by the editor of the *Western Advocate* for examination to your Department. These vegetable relics, which represent three species, prove identical with some of the specific forms of the fossils but a few years ago discovered in the pliocene drift of Smythe's Creek, and, with one exception, all only as yet known from that locality.

They belong to:—

1. *Spondylostrobos Smythii* (F. M. in Lond. Geol. Mag. March 1871, and in R. Brough Smyth's Reports of Mining Surveyors and Registrars 1871. March, pl. I.)

2. *Phymatocaryon Mackayi* (F. M. in R. Brough Smyth's Reports 1871. June, pl. II.) Both the large and minute variety. Obtained also very recently from the Rev. W. B. Clarke, F.G.S., as gathered in New South Wales.

3. *Penteune Clarkei* (F. M. in R. Brough Smyth's Report 1873. December, pl. VII.).*

The discovery of these organic remnants in a far distant tract of country in New South Wales, is not without considerable interest, inasmuch as thereby now is shown, that the pristine forests, which have left us these vestiges, were of wide geographic extent. Moreover we may probably connect, in all instances, the occurrence of

* There are also two fragments of a fourth, and perhaps unknown, fossil fruit; but the material does not suffice for exact identification.

these fossils with adjacent auriferous strata of rich yield, and may thus obtain additional indications and directions for future searches after the richest of our metallic wealth. Though through your own enlightened consideration in the essays referred to, a diagnostic and illustrative account of these three genera, and other concomitant fossils, became promulgated, we yet possess no data to reconstruct imaginarily in their integrity these particular Australian trees of the last of the past epochs.

We yet require to learn, what was the nature of their leaves and floral organs; and these, although so much more perishable than the woody fruits, may still be found preserved on most favorable spots, particularly those of the *Spondylostrobus*, as the resinous contents of branches and foliage of all coniferæ offer great resistance to decay.

The general enquiry into the constituents of these bygone forests is also far from exhausted; indeed a well directed and persevering search in any locality, where fossils of these kinds may come to light would, doubtless, not only augment our knowledge of the species already disinterred but also would likely add new generic and specific types to the store of those revealed already by palæontologic science in so many parts of the globe.

I have the honor to be, Sir,

Your obedient,

FERD. VON MUELLER.

To R. Brough Smyth, Esq., F.G.S.,
Secretary of Mines.

NOTE.—Mr. J. S. Thomas, to whose kindness the Department is indebted for the fossils named in the above report, informs me that the shaft in which they were found is about 100 feet in depth, 85 of which is volcanic rock. Under the volcanic rock, as in Victoria, is a stratum of mud or clay, with decomposed vegetable matter and trunks of trees; and beneath this, resting on the bed-rock, is the auriferous gravel (*wash-dirt*) in which the fossil seeds are found.

It is interesting to compare this section with those given by Mr. Lynch, Mr. Arrowsmith, and Mr. Reginald A. F. Murray.

R. B. S.

1st October 1874.

ON THE DISCOVERY OF VEGETABLE FOSSILS NEAR NINTINGBOOL.

BY MR. JOHN LYNCH, MINING SURVEYOR.

Smythesdale, 1st February 1870.

MY DEAR SIR,

I have this day forwarded to you a collection of fossil plants, which I think will please you. They were found in the claim of the Crucible Company, near Nintingbool, at a depth of 70 feet, and about 2 feet from the bed rock. They were imbedded in loose black sandy drift (wash-dirt). It appears that from the "Crucible" northwards through McLachlan's P.R., they are very abundant, and confined, as far as can be yet ascertained, to the very deepest ground, as I have never heard of their being found in any of the adjoining diggings. I have packed them in the sand in which they were found, but it has been passed through the sluice-boxes. A piece of wood found in the same drive accompanies them. The drift where they were found is loose, black, and remarkably free from large boulders, whereas in other parts of the claim the wash-dirt is cohesive, of various colors, and has embedded in it immensely large quartz boulders. Some of those I send to-day were collected by Mr. Chas. Thorne—from whom I procured the former collection—and the remainder by the officers of the company.

There is one (enclosed in the tin box) which seems to differ from the others. It was found a few years ago in the Pre-emptive claim, Nintingbool, where those in possession of Mrs. Burke were found. I got it from Mr. Montgomery, of Linton.

The manager of the "Reform Company," at Haddon, whose claim is on a continuation of the same deep ground as the "Crucible" and "Pre-emptive," is engaged in making another collection, which, from what I can learn, will prove still more interesting than the present one. It appears that the workmen in opening up a certain drive discovered a tree, or fragment of one, lying in the drift, and

adjacent to some very interesting specimens of fruit. The manager promised me that he would use every endeavour to recover the tree without injury, but at the same time stated that he never heard of its existence before I had informed him. I got my information from the workmen. Upon my mentioning to the manager and others that you would be pleased to get anything of the kind sought for, they one and all expressed an anxious desire to do what they could to oblige one who has done so much to confer upon Victorian mining something of the dignity of science.

I am, dear Sir,

Yours very faithfully,

JOHN LYNCH.

R. Brough Smyth, Esq.,
&c., &c., &c.

ON THE DISCOVERY OF VEGETABLE FOSSILS AT
TANJIL.

Sunnyside, Sale, 20th September 1874.

SIR,

Herewith I have the honor to forward a few specimens of fossil fruits found in a deep *lead* beneath basalt, worked by the Pioneer Company, Tanjil. On my pointing out their probable scientific importance, the manager, Mr. Hapff, promised to collect a number more for me when underground work, now suspended, is resumed.

I would beg that the specimens be submitted to Baron von Mueller or Professor McCoy, in order that I may be supplied with a proper description of them to embody in my report.

I have the honor to be, Sir,

Your obedient Servant,

REGINALD A. F. MURRAY,
M. & G. S.

R. Brough Smyth, Esq.,
Secretary for Mines, &c., &c.,
Melbourne.

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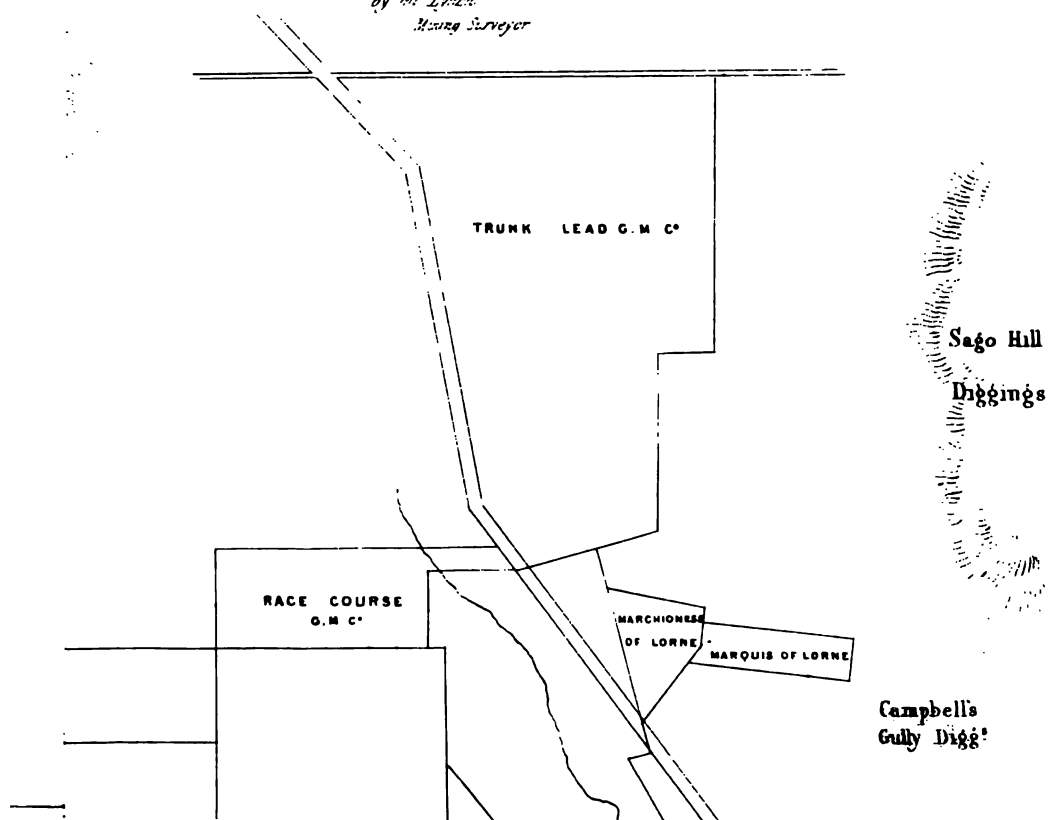
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ON OF HADDON GOLD FIELD

the localities where Vegetable Fossils were discovered.

WITH ILLUSTRATIVE SECTIONS.

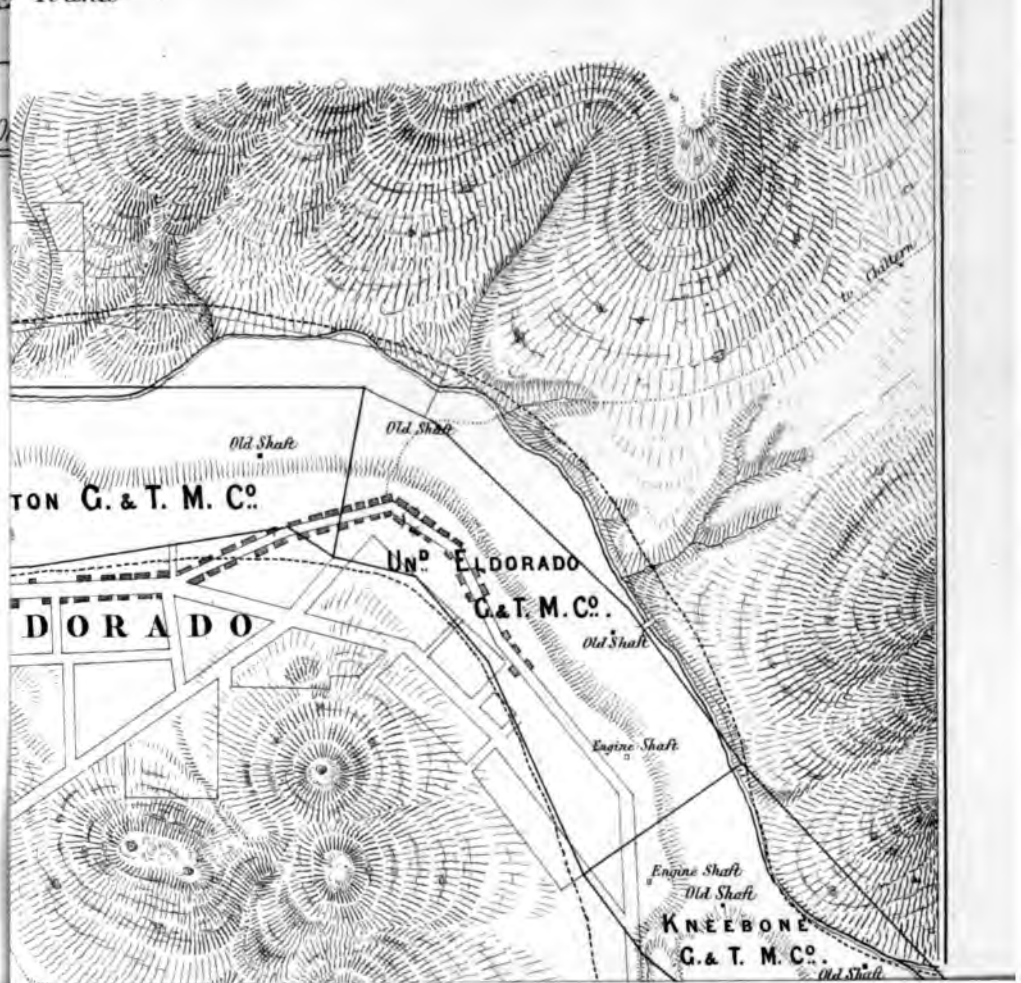
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UNITED WORKINGS

Found

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